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ABSTRACT

Covering the period July 1 thru December 31, 1977, the seventh semi-annual report summarizes the first half of the third year of operation of the educational and hatchery programs. The first section details the educational component, i.e., academic program, high school visitation program, educational and operational activities, student recruitment, and advisory services. The last section provides the following: a description of facilities which were expanded from 20 to over 10 million alevin capacity; a data presentation for egg take of pink, coho, and king salmon and for incubation of eggs and fry up to December 31; a report on the return strength and uses of the first non-profit private hatchery produced pink salmon, along with a narrative of problems encountered in harvesting salmon surplus to hatchery egg and natural escapement needs and results of the marked fry release; a presentation along with research suggestions on harvest critique and future recommendation concerning selection of fishermen and processors; and an outline of the financial budgets listing income sources and operational expenses for the past 6 months (first 6 months of 1977 are in June 15, 1977 report) and harvest income to operate the hatchery program for the next fiscal year. (AH)

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# SHELDON JACKSON COLLEGE FISHERIES PROGRAM

# DEVELOPMENT OF AN APPLIED FISHERIES SCIENCE PROGRAM

# FOR NATIVE ALASKANS

# AT

# SHELDON JACKSON COLLEGE

## SEVENTH PROGRESS REPORT

1 April 1978

Submitted by

Mel Seifert
Sheldon Jackson College

Not for Publication

TABLE OF CONTENTS


| | PAGE |
|---|---|
| Report Summary | 1 |
| Introduction | 2 |
| Background | 3-4 |
| Technical Advisory Board | 5 |
| Program Staff | 6 |
| Academic Program | 7-8 |
| High School Visitation Program | 9 |
| Educational and Operational Activities | 10-12 |
| Student Recruitment | 13 |
| Program Publicity | 14 |
| Advisory Services | 15 |
| Aquaculture Facilities | 16 |
| Abstract | 17 |
| Introduction | 18 |
| Hatchery Modifications | 19-20 |
| Operational Procedures | 21 |
| Egg Take | 21-23 |
| Incubation and Rearing | 23-27 |
| Return Strength and Uses | 27-31 |
| Selection of buyer for Hatchery Fish | 32 |
| Selection of Fishermen | 32-34 |
| Indian River Escapement | 34-35 |
| Disposition of Broodstock Carcasses | 35 |
| Egg Shipment | 36 |
| Marked Fish Recovery | 36-38 |
| Conclusions | 39 |
| Harvest Critique and Future Plans | 39-42 |
| Research Needs | 42-43 |
| Table 1 - Length Weight Data on 1977 Pink Salmon | 44 |
| Table 2 - Indian River Pink Salmon Fecundity and Egg Take | 44 |
| Table 3 - Water Temperatures | 44 |
| Appendix A Financial Report | 45 |
| Appendix B Financial Report | 46 |
| Appendix C Income from 1977 Salmon Harvest and Egg Incubation | 47 |
| Appendix D Technical Advisory Committee Membership | 48 |

## REPORT SUMMARY

1. Primary program objectives remain as originally formulated: to promote Native Alaskan education and to enhance salmon stocks for self-sustaining funds and the common property fishery.

2. Over 100,000 pink salmon returned to the SJC hatchery representing the first salmon return to a private hatchery and the largest to any single hatchery facililty in the state.

3. As a result of salmon returns beginning to private hatcheries and the formulation of fishermen-controlled regional aquaculture associations, 1977-78 was a year of much social-political activity for the program director.

4. Dr. William McNeil resigned as chairman of the SJC Technical Advisory Board due to out-of-state committments and Chet Mattson of NMFS, Auke Bay, was elected as the new chairman.

5. The basic academic curriculum has been completed and emphasizes field work, group cooperation and individual initiative.

6. New courses added to the curriculum this year were Fish Pathology and Emergency Medical Care.

7. A chronology of some notable events is presented under educational and operational activities from July to December, 1977.

8. A slide-cassette package has been completed allowing us to show and explain the program to high school students in outlying areas of Alaska.

9. Five Alaska high school students participated in the 1977 egg take as part of a career orientation experience paid for by the program.

10. The director has elected to the Board of Directors of the Northern Southeast Regional Aquaculture Association representing private hatcheries.

11. Hatchery incubation facilities were expanded from two to over ten million salmon fry capacity.

12. Data is presented for egg take of pink, coho, and king salmon and for incubation of eggs and fry to December 31st.

13. Return strength and uses of the first non-profit hatchery produced pink salmon are reported along with a narrative of problems encountered

14. Harvest critique and future recommendations concerning selection of fishermen and processors are presented along with research suggestions.

15. Financial budgets listing income sources and operational expenses for the last six months of 1977 and harvest income to operate the hatchery program for the next fiscal year are outlined.

## INTRODUCTION

The Northwest Area Foundation in 1974 provided Sheldon Jackson College with a two-year grant to develop and establish an Applied Fisheries Science Program designed for the needs oi Alaska Natives and non-Natives wishing to participate in salmon ranching.

In 1976, after determination of satisfactory progress, a second two-year grant provided funding for expansion of the hatchery from a demonstration model to a size designed to produce enough returning salmon to pay for operational costs and provide additional fish for the common property fisheries in the in the Sitka area.

Also during this second period, the Alaska Sea Grant Program began support of the educational development and is now in its second of three years of proposed funding.

This, the seventh semi-annual report covers the period July 1 thru December 31, 1977. It summarizes the first half of the third year of operation of the educational and hatchery programs.

## BACKGROUND

The history of the SJC Aquaculture Program has been recorded in six earlier progress reports. During the past six months perhaps two of the more significant events in the early history of the private hatchery concept in Alaska occurred: the beginnings of two fishermen controlled regional aquaculture associations in Southeast Alaska and the large returns of salmon to the SJC facility. The formation of the regional associations is significant in that it is the first major attempt to organize the diverse interests of the different gear types and communities in SE Alaska for a common fisheries purpose.

The return of a large number of hatchery reared salmon to the SJC facility focused attention on the potential contribution a private facility might make to a local area and at the same time brought to light the concerns of some fishermen that a number of such hatcheries might create a harvesting competition if given exclusive harvesting rights to pay their operation costs.

Thus the future of all non profit private hatcheries, both association and non-association, may well hinge on commercial fishermen acceptance of the regional association concept and their willingness to support it by self-assessment on their salmon catches. With regional associations in place, they have a vehicle under current law for direct input into decisions on all public and private hatchery site applications and hatchery harvest plans. If regional associations fail for lack of assessment support or because of their staff and financial resources being drained answering legal challenges, then social-political acceptance of the non-association hatcheries that would be remaining would be very difficult to achieve.

Thus the awakening of public awareness to the potentials and problems of the private non-profit salmon hatchery system in Alaska because of the publicity generated by the regional associations and SJC experiences has resulted in a great deal of administrative and staff time being spent on socio-political concerns.

The SJC Aquaculture Program is therefore still in the foreground of the evolutionary process of private salmon hatchery development in Alaska. We will continue no doubt to be the testing ground for new regulatory concepts until more hatcheries get into production. We accept this challenge and feel it provides a service which fits right into our program objectives which remain as originally formulated and are restated in this report.

## TECHNICAL ADVISORY BOARD

Each November and May, the Sheldon Jackson College Aquaculture Program Technical Advisory Board meets to evaluate the program's progress and to offer suggestions for improving it. Dr. William J. McNeil has been Chairman of the board since its inception and has given tremendous support to the program. However, because of his work in Oregon, as General Manager of Oregon Aqua-Foods, he felt he could not devote enough time to the Board, and submitted a letter of resignation. The College plans to honour Dr. McNeil for his work with the program by a special "Bill McNeil Day" in April 1978, during the College's Centennial celebration.

A new chairman was elected at the November board meeting, Chet Mattson of the National Marine Fisheries Service. Mr. Mattson has also been a member of the board since its beginning. Two new members were elected to the board, Dr. Donald Hales and Curt Kerns, Aquaculture Specialist for the University of Alaska's Marine Advisory Program. On the agenda for the meeting were the Aquaculture Staff Reports, a review of hatchery operations and the narvest. (See Appendix D for current membership)

PROGRAM STAFF

The following staff members are responsible for carrying out the program objectives: Mel Seifert, Director, is in charge of all operations. Dennis Lund, Production Manager is responsible for expansion of hatchery facilities, hatchery production, and marketing of returning adults; Mack Cook, Instructor, is responsible for continued development and teaching the academic curriculum. David Bright, Aquaculture Supervisor, is in charge of the operation and maintenance of the hatchery, weir sites, and work crews; Cathy Hanson, Administrative Assistant is responsible for student recruitment, program publicity and clerical work; Gabe George, Teaching Assistant, is responsible for assisting and teaching of hatchery courses.

ACADEMIC PROGRAM

Fall Fisheries Science class began with 9 students, 7 of which were returning students, of these, 1 dropped out for personal reasons. The complete curriculum for not only their class but the entire program has been completed. This curriculum emphasizes field work, group cooperation, and individual initiative, especially in the area of fishery science. In view of the reactions and feedback from this term, the amount of outdoor work will be increased and in many cases, in-class work will be spent in preparation for field exercises which will be made more detailed and extensive.

Eleven students arrived for the fall Fish Husbandry class. In several cases students are attending the class in anticipation of work in areas such as Fish and Game, conservation, oceanography and fish processing. Again, the participation in the salmon spawning operation associated with this class was well attended.

Completion of this term marks the 1st full year of use for the laboratory manual written here. After this field testing, amendments and additions will be made and hopefully, a published manual will be ready for service or reference by the summer of 1978

Because of the bi-cultural nature of the college, exams and inter-class exams were given in an effort to take advantage of the Native Alaskans natural abilities. Also the oral exams were continued with the equaled success of the past years.

Five field projects have been undertaken this fall. In order to organize and evaluate the efforts spent on these independent projects, a rigid schedule has been established complemented by a well-defined grading system. Also, we are allowing students to choose a staff member to work under to increase staff-student involvement and taking advantage of a broader spectrum of experience.

The Interim offering (month of January) for 1978 will include an emergency trauma training course designed to prepare our students for prehospital emergency medical care. We feel this is a valuble skill for technicians anywhere and especially those assigned to remote areas. Most of the Interim month will be taken up by the study of fish pathology and practice in bacteriological techniques which will include the Alaska Department of Fish and Game fish disease short course. We are still in the process of adding information to this course. More preserved specimens of microscopic pathogens are needed for lab material. It is our current policy not to bring in or culture live pathogens and chance accidental infection of our hatchery stocks. If the need arises, proper facilities for handling such organisms can be added.

HIGH SCHOOL VISITATION PROGRAM

Five high school students accepted our offer of an "all expense paid trip to Sitka" to spend a week at the hatchery, learning about fish culture. They were Jimmy Vaska and Darlene Albertson of Aniak, Tim and Mark Pearson of Nome, and Loree Shales of Hoonah. They learned salmon spawning techniques and were of tremendous help to the program staff in helping to take our quota of 10 million pink salmon eggs. They toured the Alaska Dept. of Fish and Game's coho rearing facility at Starrigavan Bay, and attended a talk by Dr. Derek Poon on salmon ranching in Southeastern Alaska. Having these kids with us for a week was a valuable and rewarding experience for all of us, we hope to repeat the program in the future.

MARK DARLENE TIM LOREE JIMMY



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## EDUCATIONAL AND OPERATIONAL ACTIVITIES

| | | |
|---|---|---|
| July | 5 | Director presented testimony in support of salmon enhancement to Sub-committee on d-2 lands bill, HR 39. |
| | 11 | Received new hatchery permit and approval for harvest area from Dept. of Fish and Game. |
| | 14 | First returning pink salmon observed jumping in back of hatchery building. |
| | 18 | Adipose-clipped humpie (Katlian x Katlian) caught near Sitka. |
| | 20 | First humpies pass up Starrigavan ADF&G weir. |
| | 22 | Slide-lecture program for college volunteers. |
| | 23 | Hatchery tour for patients of Alcohol Therapy Service. |
| | 25 | King salmon caught in SJC tailrace trap. |
| | 26 | First three humpies in SJC tailrace trap. |
| | | First pair humpies seen spawning in Indian River. |
| | 27 | Okay given by local Fish and Game personnel to begin harvest. |
| | 30 | Seiner Herman Kitka harvests 6,577 pinks for hatchery. Turned loose at least that many from his net. |
| August | 3 | Slide show on program at National Historical Park |
| | 5 | Small chum in trap today |
| | 8 | Kitka harvests fish again, total 11,920 fish. |
| | 9 | First day of spawning at hatchery, spawned 166 females,34 males. |
| | 10 | Spawned 189 females, 71 males and to date, gave away 888 carcasses. |
| | 11 | Coho in trap |
| | | Nancy Branlund takes Aquaculture Program exhibit to Haines Fair |

| | | |
|---|---|---|
| August | 12 | Seiner Charlie Carlson fishes for SJC today. Spawned 191 females, gave away 150 males. |
| | 18 | Met with Ron Maya, City Manager of Cordova on educational aquaculture facility in Cordova. |
| | 19 | Interview with reporter for New Alaskan. |
| | 20 | Sockeye in trap, but it escaped. |
| | 23 | Interview with Roger Painter of the Alaska Advocate |
| | | Moved 1000 pink salmon to upper Indian River to spawn. |
| | 24 | Charlie Carlson fishes for SJC, total for the day 20, 800 pinks. |
| | 24 | Moved more pinks up Indian River. Spawned 150 females. |
| | 26 | Five high school students arrive for one week of fisheries career orientation. |
| | 27 | Research ship " Acona" from Seward visits Sitka. |
| September | 2 | Spawn another 300 females. |
| | 6 | First pink eggs taken strongly eyed. |
| | 14 | Dennis Lund attends Alaska Fisheries Council meeting in Juneau. |
| | 26 | Fisheries scientist Dr. Janos Bakos toured facility with Bill Shields of Kramer, Chin and Mayo. |
| October | 5 | Dr. Richard Lee of the Univ. of Alaska Marine Advisory Program meets with staff on possible high school aquaculture curriculum. |
| | 11 | Gabe George leaves on recruiting trip in Southeast Alaska. |
| | 19 | Keith Specking visits hatchery. |
| November | 1 | Director attends Coastal Management Workshop. |
| | 2 | John Sichel and Dr. Tivett from Wildlife Vaccines show film and talk with fisheries students. |

| | | |
|---|---|---|
| November | 4 | Shipped live pink eggs to Oregon State University. |
| | 21 | Aquaculture Program Technical Advisory Board Meeting. |
| December | 8 | Air temperatures 0-12 degrees Celsius. Pumped salt water through Netarts boxes to reduce ice build-up. Surrounded boxes with bark to insulate them. |
| | 15 | Tom Roach from Senator Gravel's office visits hatchery. |

STUDENT RECRUITMENT

Student Recruitment during the last six months centered around the program's Newsletter, visits to high schools in Southeastern Alaska, and the initiation of a slide-cassette program on the Aquaculture Program.

The Newsletter continues to bring good response from students and high school teachers alike. The Newsletter emphasizes aquaculture activities at Sheldon Jackson, but includes such features as interviews with staff and fisheries students, marine-oriented crossword puzzles, Alaska-style seafood recipes, and a series on the life cycles of the 5 species of Pacific salmon.

Fisheries Biology Instructor, Gabe George, made a recruiting trip through Southeastern Alaska this fall. He visited Hoonah, Angoon, Craig and Hydaburg and talked with high school students about the program and gave a slide show in each village. In addition, the College's Recruitment Officer is a knowledgable fisherwoman and represents the program well.

The development of a slide-cassette "package" has allowed us to bring the program to outlying areas that we could not reach in person. Approximately 70 slides on the program and a taped narrative are sent upon request to high school biology classes. Four of these packages are available now.

PROGRAM PUBLICITY

The excellent return of fish to the hatchery in 1977 generated tremendous interest in the program and the College in general. Newspapers in the South 48 as well as in Alaska, carried stories on the success of the first completed cycle of the hatchery.

A video tape of the August spawning sequence was made by SJC Director of Media, Dan Etulain, and after editing it is hoped that the film will be shown on television state-wide, as well as in classrooms as part of our recruitment and public relations efforts. A new program brochure was also completed and printed this summer, along with other material on the program, such as course descriptions.

ADVISORY SERVICES

Advisory services continue through educational programs, individual and group visits to the hatchery, program publications, directing inquiries to approximate contacts, on site visits, aid to University of Alaska Marine Advisory Program, our Aquaculture Newsletter, responses to telephone calls and letters and sharing our experiences with any who request it. Our main service will continue to revolve around the training of future employees for the private and public aquaculture-related industries in Alaska.

Last fall's successful salmon return to the hatchery generated much publicity which in turn has generated an increasing number of contacts requesting exchanges of information and attendance at meetings both related and only indirectly related to fisheries as a resource. Likewise, as we are physically in the forefront of the private salmon industry in Alaska, so it follows that we necessarily find ourselves increasingly involved in the socio-political arena with requests to defend, criticize, analyze and review many items of legislation, regulations, policies or proposals that have any connection with hatcheries and aquaculture in Alaska. Additionally, the program director was elected to the Board of Directors of the Northern Southeast Regional Aquaculture Association to represent non-regional association private non-profit hatcheries. Most of the private non-profit hatcheries in Alaska so far either in operation or in the process of obtaining a permit are in the northern half of Southeast Alaska. It is an exciting and challenging period in Alaska's fisheries with complex implications few of us as yet can appreciate. Whatever the outcome, Sheldon Jackson College Aquaculture Program is in the thick of it.

## AQUACULTURE FACILITIES

As required by our private non-profit salmon hatchery permit, the following section on the hatchery operations represents the annual report to Alaska Department of Fish and Game. It follows a format set forth by Fish and Game describing a specific list of information that must be included.

This report describes the primary biological-physical aspects of the salmon hatchery operation. All phases of the hatchery operation are utilized for their training potential for our students who are both required and encouraged to become involved to the maximum of their available time and abilities. Their involvement continues to be time well spent both for them and the hatchery and their efforts are acknowledged as a significant contribution to the continued success of the program.

I. Abstract

The Sheldon Jackson College Aquaculture Program is midway through its third year of providing an educational opportunity for Alaskans wishing to learn salmon culture skills and of enhancing the salmon stocks of the Indian River system.

Incubation facilities which were expanded from two to over ten million alevin capacity are described.

Data are presented for egg take of pink, coho and king salmon and for incubation of eggs and fry up to December 31.

Return strength and uses of the first non profit private hatchery produced pink salmon are reported along with a narrative of problems encountered in harvesting salmon surplus to hatchery egg and natural escapement needs and results of the marked fry release.

Harvest critique and future recommendations concerning selection of fishermen and processors are presented along with research suggestions.

Financial budgets listing income sources and operational expenses for the past six months (first six months of 1977 are in June 15, 1977 report to ADFG) and harvest income to operate the hatchery program for the next fiscal year are outlined.

## II. Introduction

The Sheldon Jackson College Aquaculture Program is midway through its third year of operation. It was initiated to provide an educational program designed to meet the needs of Alaska Natives and others wishing to participate in salmon ranching. Hatchery operations serve to teach fish culture skills while a portion of the returning salmon production provides the basic economic support to achieve our primary program objectives. These objectives are as originally formulated:

1. To promote Native Alaskan education by providing an educational career ladder for Indians, Eskimos and Aleuts, so that what they learn can be applied to a practical and meaningful vocation.
2. To enhance salmon stocks by establishing a private hatchery on campus to produce fish for the common property fishery and as a source of self-sustaining funds for the program.
3. To promote cooperation among public and private organizations involved in the development of salmon ranching.
4. To provide technical assistance and advice to Native and non-Native corporations and individuals by sharing our own experiences and the knowledge gained from others.

In June, 1977, an annual report was filed with the Alaska Dept. of Fish and Game covering the entire 1976-77 hatchery cycle as proscribed by law. During the fall legislative session,the report date was changed to December 15 of each year. Since the first six months of 1977 are already on file, this annual report for calendar year 1977 will only cover July 1 to December 15, 1977.

III. Hatchery Modifications

A. Personnel - The following staff members are responsible for carrying out the program objectives: Mel Seifert, Director, is in charge of all operations. Dennis Lund, Production Manager, is responsible for expansion of hatchery facilities, hatchery production, and marketing of returning adults; Mack Cook, Instructor, is responsible for continued development and teaching the academic curriculum, Dave Bright, Aquaculture Supervisor, is in charge of the operation and maintenance of the hatchery, weir sites, and work crews; Gabe George, Teaching Assistant, is responsible for assisting and teaching of hatchery courses; Cathy Hanson is Administrative Assistant and Program Secretary.

Additional labor is provided by technician students as part of their training experience. New students participate in the egg take and assist in operation of the hatchery throughout the year as part of their hatchery practicum. Two or three second year students are hired through a campus work/study program to assist in the hatchery as their academic time permits.

B. Physical Facility - The expansion of incubation facilties from 2 million egg capacity to 10-15 million capacity was essentially described in the June 15, 1977 report.

The original 2 million egg capacity Netarts type boxes were relocated next to the hydro tailrace. The plywood was still in good shape after two years use. The six 4' x 48' rows were combined into four 4' x 72' rows. Insulation in the form of bark chips (donated by Alaska Lumber and Pulp Co.) were banked around the outside of the boxes and between the two double rows. This was not

necessary until the first sub-freezing of the winter occurred in early December.

As planned, in the area behind Sage Building vacated by the Netarts boxes, a new incubation rearing system was constructed consisting of four concrete raceways, each 60'x 60'x 3' deep. They are currently in use as incubation channels and can be used for short term rearing. A recirculation pump is in place by the outlet trough for emergency use if the gravity flow water supply is interrupted.

The hydro tailrace was modified as planned to provide larger adult salmon holding areas. A downstream dam and fish pass were constructed which provided a holding area of approximately 20'x 70'x 2½' deep. Another fish pass of about the same height allowed fish to enter a wire mesh trap about 4'x 30' and be sorted into holding pens within a 40'x45' pool.

In the basement of Sage Building, one room was converted to hold stacked gravel incubators. All units are four boxes high. The boxes in seven of the units are approximately 54 cm. wide x 300 cm. long x 15 cm. deep. The boxes in six more units are 54 cm x 200 cm x 15 cm. Water from all units drains into a sump before flowing down to the beach. A recirculation pump is stationed by the sump which is capable of pumping water to all incubation and rearing units within both basement rooms of Sage building.

Also in the basement is a seawater pump capable of supplying salt water to the basement and first floor of Sage or to the concrete raceways and Netarts boxes.

IV. Operational Procedures

A. Egg Take

1. Pink Salmon - The 1977 pink salmon return was larger than expected to all area streams and the SJ hatchery. All hatchery eggs were taken from salmon that entered the tailrace. Spawning took place between August 9 and September 24th. This included 962,000 eggs shipped later to Oregon State University which were donated by Alaska Dept. of Fish and Game from Indian River stock and incubated at Sheldon Jackson. As the eggs were taken right at the hatchery, there was no transportation involved of eggs or live brood stock. And as the salmon were not held very long there was only incidental pre-spawning mortality.

Tables 1 and 2 present the length-weight and fecundity egg take data respectively for the 1977 brood year pink salmon.

Spawning procedures were as follows: ripe females were removed from the trap or holding pens, stunned by a blow on the head, and laid on a wire mesh table for wiping with a cloth. After the first day of spawning, eggs were checked for cell division the following morning and it was determined that the amount of blood in the spawning container along with the eggs had no effect on fertilization as all eggs examined were found to be undergoing cell division. As a result of this test and similarly conducted continuous monitoring, no females were bled prior to spawning this year. A cloth draped over the edge of the egg bucket absorbed most of any excess blood that came out with the

eggs. Each container received the eggs from 10 females and milt from 10 males. For each group of eggs fertilized, five containers of eggs from 50 females were maintained in a water bath and each container received milt from each of 10 males.

Thus the spawning ratio was one male for five females. Eggs placed in the Netarts boxes were water hardened before being deposited and spread on the plastic mesh egg trays underwater while those in the concrete raceways were poured and spread over a plastic mesh tray floating at the water surface while still soft before water hardening and the tray submerged by the next tray placed on top of it. No significant difference was found between the two methods relative to fertilization success. Thus no unexpected amount of egg mortality has been noted prior to hatching.

2. Chum Salmon - Due to low spawning runs of chum in the Sitka area and none seen in Indian River, no chum eggs were obtained for the hatchery this year.

3. Coho Salmon - As in the past, a few coho salmon were taken on an educational collector's permit to provide some training with fish requiring long term rearing and to enhance the Indian River population. All cohos were captured in the hydro tailrace. Ten females, six males and about 50 jacks entered the tailrace. Three females averaging 68 cm and 4 kg were spawned October 14 and 18, yielding approximately 10,500 eggs fertilized by two males averaging 73 cm and 4.7 kg. Several of the cohos died while being held for ripening and the others were turned loose. Two of the jacks were fin-clipped and were turned over to Fish and Game. Later analysis of the coded wire tags identified one as coming

from the Starrigavan Rearing Pens and the other was from a group released by our hatchery on April 5, 1977. At that time, these smolts averaged about 4 inches (10 cm) and this one was over 14" (35.5 cm) by October 5th.

4. King Salmon - This year for the first time, some king salmon entered the tailrace, one female and two males. The female was spawned on August 25 and produced about 3,500 eggs. All were about 39 inches (99 cm) and were turned over to Fish and Game for possible identification of origin.

B. Incubation and Rearing - The 1976 brood year data on eggs and fry was presented in the July 1977 annual report. The following material concerns eggs taken in August and September 1977 incubated to December 31st. **

The Netarts boxes were stocked first beginning August 9th. Because of the warm water temperatures prevailing at that time (9-12 degrees C.) embryonic development was rapid and these eggs were moved into Sage Building stacked gravel incubators prior to hatching in October. The boxes were then restocked with the last eggs taken in September. Stocking densities remained as in the past at 5.7 - 6.6 eggs per square inch (1 per $cm^2$) on the 4 square foot (1.5 square meter) plastic mesh trays. At three trays per unit, this resulted in 17-20 fry per square inch (3 per $cm^2$) on the gravel substrate.

The first unit (4' x 4') in each row was left empty of eggs to act as a settling basin for silt. Thus the remaining eleven units in each of the four rows contained 440,000 to 498,000 for a total of 1,845,000.

** See Table 3 for water temperatures

Flow rates through the Netarts boxes was 100 l/min. (26 gpm) until the eggs eyed then reduced to 60 l/min. (15.8 gpm). Basic reason for the higher flow rate needed in early development is the growth of iron bacteria that occurs until the water cools down later in the fall. Higher flow rates rates provide better assurance of oxygenation for the eggs until they are cleaned and restocked after eyeing. By that time the filamentous growth caused by the iron bacteria is inhibited by cold water temperatures. This year due to warmer than normal water temperatures in early fall, it was necessary to clean the growth out of the boxes twice before hatching.

During the period December 6-10, air temperatures in Sitka ranged from 0-20 degrees F. (-18 - 8 degrees C.) and water temperatures fell to 32 F (0 C). Some freezing began on the sides and at the water surface of the Netarts boxes. Insulation in the form of bark chips donated by ALP were put in place around the outside and between rows. Saltwater up to 15 0/00 was pumped through the rows to raise the temperature enough to eliminate ice build-up and prevent further freezing.

The concrete raceway system was stocked next and utilized in two ways. First two raceways were stocked for eyeing eggs at double their hatching capacity. Later, a layer of gravel was added to the empty raceways, the trays of eyed eggs were cleaned, transferred and dispersed at the appropriate hatching density.

For eyeing, two of the four 8' x 60' raceways were maintained at a water depth of approximately three feet and water flow of 567 l/min (150 gpm). Linear flow was maintained through the water column by perforated headboards every eigh feet positioned directly upstream from the stacked incubator trays.

upstream from the stacked incubator trays. The egg trays were approximately 3' x 4' (0.91 - 1.22 m) and stacked 15 high with two stacks side by side behind the perforated headboards. Egg densities were approximately 18-20,000 per tray (10.4-11.5 eggs/inch$^2$ or 1.6-1.8 eggs/cm$^2$). Each double stack unit comprised approximately 500,000 eggs for a total of 3 million eggs per raceway. The first 8 feet of each raceway was left empty for settling silt. Also a debris strainer was positioned under each inlet pipe to filter out larger particles such as tree leaves which would have clogged the perforated headboards. Periodic maintenance was necessary to keep the perforations open. Very fine silt did reach and settle on the upstream lots of eggs but in general caused very little suffocation as water was able to pass under each tray. It is doubtful this system incubation, which is similar to the Washington Pond Tray method, would work for more than a single layer of eggs because of the silt load Indian River carried during the early fall rains. After this period, the water remains clear for the rest of the hatchery cycle. The raceway system we have constructed here has the option of using one entire race for settling then directing water into a second race containing the stacked egg trays.

The stacked shallow gravel box system is described in the previous section on hatchery modifications. Water flow is laminar at a rate of 30 l/min, cascades from one box down to the next, reverses flow direction and so on down through the four levels of each stacked unit. Each unit is about 7 feet high (2.1 m) with one 1 foot (0.3m) of work space between each level of incubator box. Boxes are supported by 2" x 4" wooden framework.

Within each the stocking density is, as in our other incubator types, 20 fry per inch$^2$ or about 3 per cm$^2$. This yields approximately 50,000 fry per each 300 cm box and 33,000 for each 200 cm box and totals 2,100,000 for the 13 units in the room. In one unit data is being gathered on the effects of three different stocking densities (1.5, 3.5, 4.5 fry/cm$^2$) and three different flow rates (20,30,40 l/min). In all boxes, water level is maintained by standpipes and fry movement is inhibited by perforated aluminum plates positioned midway and directly in front of the standpipe. It has been found that 1/8 inch perforations are about maximum allowable diameter in these plates as sac fry can get through this size hole if they actively attempt to do so. We cover the perforations to a level just about the gravel depth as fry that accidently move against the plate while up in the water column tend to swim away while those wriggling around in the gravel tend to get stuck in the plate holes. A smaller diameter such as 3/32" could be used but this convenience would have to be weighed against greater susceptibility to clogging of the small perforations.

In general, these incubators are stocked in the manner of the raceways with single layer egg trays above gravel substrate. This year some eyed eggs and sac fry were seeded directly onto the gravel with no apparent mortality differences to date. It is recognized that this system is not very efficient in terms of space utilization but until some deep matrix system proves adequate for our water quality conditions, we will stick to a shallow gravel

substrate which we know does work. We are testing bio-saddles as a substrate and preliminary results indicate that some form of incubation system using this type of material offers the best potential for increasing production without increasing space or water supply.

The other basement room is used for a variety of activities including teaching and research. Therefore, various amounts of eggs are found there testing incubator modifications, substrate types, effects of salt versus freshwater at different development stages, etc. These are small quantities relative to the entire production and make up the difference that may appear between the total reported and the sum of the various systems discussed here.

C. Return Strength and Uses.

1. Appearance of fish and chronology of 1977 harvest - Pink salmon were first seen jumping in the SJC harvest area by early July. By July 12th, they were jumping in large numbers from Jamestown Bay to the area in front of the Sitka Visitor's Center. Initially no fish were noticed off shore from the hatchery, undoubtedly because the hydro turbine had been off all summer to enable construction of fish holding facilities in the tailrace. The day after the hydro was reactivated (July 13) fish began schooling in the hatchery area.

An estimated 40,000 fish were in the harvest area by July 29, an adequate number to provide Indian River (5,000) and hatchery broodstock (15,000) escapement plus a sizable harvest. Permission was obtained from ADF&G to fish and Herman Kitka and his crew donated their time and equipment for the first harvest of 6,577 fish on July 30. More fish were caught, however, but the processor was unable to take more so the rest (10,000-15,000) were released.

Although more fish continued to enter the area, additional harvest was delayed due to the inability of any processors contacted to take hatchery fish in addition to the wild fish which were filling their canneries, the result of unanticipated record returns of pink salmon in S.E. Alaska.

By August 8, more processing and tender capacity was available from the processor due to their efforts to cope with the large surplus and the decline of catches from the Southern southeast districts as wild runs tapered off. The first fish were spawned for hatchery incubators on August 9th. Additional hatchery harvests occurred on August 8 (11,920 fish), August 10 (12,784), August 12 (16,000), August 13 (22,737), August 24 (23,155) for a total harvest of 93,173 fish weighing 465,863 pounds. At 25¢/lb gross income equaled $116,465.75 minus 20% paid to fishermen ($23,293.15) leaving $93,173.00 net income for the hatchery program budget for fiscal year 78-79.

By the last harvest date there were no more bright fish in the catch. The initial catch had been 85-90% top grade fish. Fish were transported from the hatchery out fall to Indian River on August 24, and September 9 and 10. Heavy rains on Sept 10-12 resulted in most of the remaining fish off the hatchery moving over to Indian River. From that point on, in order to get as many eggs from late run fish as possible all fish entering the trap were spawned.

2. Regulatory Difficulties - One of the difficulties encountered in the management of returning hatchery fish this year was the lack of regulations right up to the time of harvest. The following summary set down in chronological order is not meant as a negative criticism toward any particular agency or personnel but rather as a record for future reference to hopefully avoid similar problems at other hatchery sites with advanced planning. Our hatchery staff have more or less resigned ourselves to the fact that our program is the guinea pig for the initial socio-political evolution of non-profit salmon hatcheries, particularly non regional association hatcheries, simply because we are the first to complete the hatchery cycle and have returning salmon. Our attitude in dealing with all agencies involved has been that we don't expect them to do everything right the first time around if they give us the same lattitude. The non-profit hatchery system is a new concept for us all with no similar prior experience to draw on. That experience is now being developed and we need to utilize it to the best of our abilities to maintain the system at least long enough to give it a fair trial and at the same time develop the confidence and support of commercial fishermen for whom the system was presumably designed to benefit.

In November 1976 the Technical Advisory Board for the SJC Aquaculture Program discussed and recommended approval of a hatchery management area and harvest options should surplus fish return.

---In January 1977 our local ADF&G management biologist reminded Juneau Fish and Game personnel that time was drawing short for decisions on an SJ harvest area and methods. Time was needed to develop an equitable or fair a way as possible for participation by commercial fishermen in any potential harvests as per the philosophy of the hatchery staff.

----On July 11 we received approval of hatchery management area and harvest plans from the Commissioner of ADF&G.

----On July 13 salmon began schooling off the hatchery tailrace.

----On July 17 the first purse seine opening of the year occurred locally with large catches of pink salmon.

----On July 25 hatchery management area was closed to all commercial and sport fishing.

----On July 28 second local purse seine opening occurred.

----On July 28 at 7:15 pm, Lt. Governor filed a set of Emergency Regulations for Private Non-profit Hatchery Harvest adopted on that date by the Board of Fisheries effective for a period of 120 days only and we were informed by telephone as to the content of those regulations.

----On July 29, Division of Fish and Wildlife Protection was notified that limited entry permits for seining could be contracted by the hatchery to harvest salmon in the hatchery area with written authorization from the hatchery.

----On July 29 SJ hatchery area opened to harvesting by hatchery personnel or contractees by emergency order.

----On July 30 local seiner conducts first hatchery harvest. Subsequent harvests by contracted fishermen occurr on August 8,10,12,13 and 24.

----On August 2 written copy of emergency regulations received.

----On August 19 experimental limited entry permits for hand purse and beach seines were received. The original request for these permits was based on the uncertainty as to the best kind of gear and method which could be used effectively under the shallow water area conditions near the hatchery. These interim permits were valid for 120 days to November 24 but never used as commercial seiner harvest proved adequate.

On August 25, 30 days after closure, the hatchery mangement area was reopened to sport fishing and regular commercial fishing regulations.

The hatchery egg take continued until September. Thus the lack of regulations negated any possibility of general fishermen participations via some system such as a lottery or contract bidding. By the time the authorized methods were known, the fishermen were busy with multiple and frequent purse seine openings of their own and seeking their involvement was limited to that which is narrated in the following section. Combining the availability of fishermen and tenders became a major task. Fortunately, the situation turned out alright for everyone concerned and pre-determined regulations for 1978 should go a long way in refining future operations.

3. Selection of Buyer for Hatchery Fish - In April 1977, a form letter was sent to more than 50 fish buyers and processors in Alaska and Washington, seeking bids on hatchery fish carcasses. Only 4 processors responded, 3 showing some interest. Further correspondence resulted in 1 processor, Petersburg Fisheries Inc. getting the bid. Low response to the bid invitations was likely due to the low numbers of fish (15-20,000) mentioned in the form letter and their anticipated quality (spawned carcasses). Two processors asked to be considered for future bidding when surplus high quality fish would be available.

The original bid by PFI was for the current seine price on pink salmon. As hatchery fish quality deteriorated, price was reduced to 25¢/lb for all fish. During the period when PFI was unable to handle the hatchery fish, most of the processors in Alaska and some in Washington were contacted in an attempt to find another buyer for the fish. All Alaskan processors appeared to be operating at capacity. After considerable effort, two independent freezer ship operators were found who were interested in the fish. By that time, however, the runs in Southern S.E. districts had tapered off and PFI had both tenders and processing capacity to take SJC's fish so harvest for PFI resumed uninterrupted until the desired number of fish were taken as detailed above.

4. Selection of Fishermen - Prior to the return of the fish, no attempt had been made to contract a seiner to harvest surplus fish. The maximum return expected was 2% of fry released, or 34,000 fish. After 20,000 fish were allotted to hatchery broodstock and Indian River, only 14,000 fish would have remained to be caught. It was anticipated that hatchery personnel could harvest this small number, either at the hatchery trap or by hand

purse seine. Accordingly, a small seine was built and the necessary permits obtained from ADF&G.

When it was apparent that the run was exceptionally large, an attempt was made to contract with one or more commercial seiners to harvest the surplus. Due to the short time available, the deteriorating quality of the hatchery fish, and the excellent fishing on wild stocks, only a limited number of fishermen could be contacted. An attempt was made to contact at least 22 seiners moored in Sitka. At least 11 skippers were contacted personally. Four skippers showed interest in harvesting. Only two decided to fish. Factors limiting the availability or interest of fishermen in harvesting the hatchery fish included: 1) the unavailability or unwillingness of either skippers or crew or both to fish during non-fishing days when the boats were in port, 2) the price offered them by SJC was too low, 3)unwillingness of some skippers to risk their gear fishing for low value (to them) hatchery fish and perhaps jeopordize their ability to fish for wild fish during regular openings, 4) unsuitability of some boats and gear arrangements for fishing in the shallow water near the hatchery and making dime sets (letting out only part of the net).

The main effort to contact fishermen was on local boats, however, not all local boats were contacted. Interestingly, although considerable discontent has been voiced by some fishermen with the way contract seiners were selected, not one fisherman came to hatchery personnel and asked to participate. No one would have been turned down, had they asked. The two crews fishing were paid 5¢/lb, 20% of the value of the fish taken.

The fishing was easy, with single sets of over 10,000 fish occurring several times. Additionally, 2-6 hatchery personnel assisted by driving fish to the net using several skiffs at times as well as with drying up the net, unloading the fish, etc. No more than 5 sets were made any one day. Fast "dime" sets were most effective as the shallow water (potential snagging) and advanced stage of the fish (many became tangled by their jaws on the net) made hauling in the entire length of the net very laborous. The tightness of the fish schools and herding activity by hatchery personnel made use of the entire net unnecessary.

Over half the total fish caught were brailed directly from the fisherman's net into the tenders, making use of the fisherman's hold unnecessary, but making a tally of the fish taken more difficult.

5. Indian River Escapement - In discussions with the Sitka area Management Biologist in 1976, it was established that 5,000 fish should be the desired minimum escapement level to Indian River. For the last decade, natural runs to Indian River have averaged less than 1000 fish. In 1975, 3,150 pink salmon (including 650 transported there by hatchery personnel) spawned in Indian River. This was the largest run anyone could remember for years. In 1977, escapement to Indian River was approximately 10,000 fish of which 4,500 were transported there by SJ and ADF&G personnel. Over 2,000 of those were stocked upstream from the SJ diversion dam - an area inaccessible to natural runs. Near the end of the run, an aerial survey by ADF&G indicated about 30,000 fish remaining off the hatchery outlet and 1000 off Indian River (1/2 mile away). This may have been indicative of relative returns of hatchery and river fish, low water conditions in Indian River, or attraction of

river fish away from the river by hatchery fish. With closure of the hatchery weir and high water in Indian River, many of the fish that were holding off the hatchery moved over to Indian River.

Dark fish towed to the mouth of Indian River and released ascended the stream immediately. This was to be expected since the hatchery utilizes Indian River water and the fish were nearly ripe. Over 1000 fish at a time could be captured at the hatchery's lower fishway and towed to Indian River in a floating 6' x 16' x 3' deep pen. Fish transported to upper Indian River were dip netted from the hatchery trap and carried in a dump truck lined with plastic sheeting.

6. Disposition of Broodstock Carcasses - 16,974 fish entered the hatchery trap. Those females not spawned were transported to Indian River. Spawned carcasses and unspawned males were either given away to the public (approximately 3,000 fish) or taken to a local processor. The processor disposed of some of the carcasses in the worst condition by grinding them and pumping them thru their deepwater discharge system. Most, however, they froze for commercial crab and halibut bait. Had cold storage facilities and personnel not been so taxed handling the large run, more carcasses would have been frozen for bait. Preliminary reports are that the carcasses make good crab bait. By late May they will have been tested as halibut bait. There is a potential for this market to grow if tests prove favorable.

7. Egg Shipment - Oregon State University requested from the State of Alaska one million pink salmon eggs to start a run for research purposes at the OSU Marine Science Center in Newport, Oregon. Thru agreement with the Oregon Dept. of Fish and Wildlife, Alaska Dept. of Fish and Game, Oregon State University and Sheldon Jackson College, 1 million eggs were taken from the Indian River stock at the SJC weir. 962,000 eggs were sent to OSU on November 4, 1977. SJC received a total of $9,139 for incubating the eggs (1¢ per estimated viable egg plus packaging, and shipping charges. An OSU fish pathologist inspected the brood stock prior to shipment and the fish were certified parasite and disease-free. OSU would like to obtain a million more eggs in 1978.

8. Marked Fish Recovery - An experiment was conducted with 1975 brood year fish to determine the feasibility of transplanting fish to a hatchery site from a nearby donor stream. The experimental design is described in the July 1, 1976 SJCAP progress report. Briefly, three groups of marked fry were released: donor stream fry from Katlian(adipose clip), home stream fry from Indian River( left ventral clip) and a cross of Katlian donor stream eggs and Indian River fish sperm (right ventral clip).

Ten thousand fry of each group were to be marked. We assume an 0.85 marking efficiency, resulting in 8,500 fish marked in each group. The low efficiency is due to the inexperienced and constantly changing marking crew that year. Other activities prevented an actual visual determination of marking efficiency. However, 1976 brood fry were marked at a verified 90% efficiency by a more experienced and constant crew. The fry were released in the same manner as the unmarked fry, however, all the pure Katlian

fish were released on one day, May 22nd, at the end of the fry out-migration period. This makes direct comparison difficult between that group and the other 2 groups which were released in small numbers over a period of 18 days from April 14 to May 2nd.

Due to the pressure of hatchery construction, fish harvesting and egg take, hatchery personnel were unable to undertake extensive fin-marked fish recovery. Fish from the commercial seine harvest were sampled when time allowed. The following summarizes the data.

Mark Recovery

| Date | Source | # Caught | # Sampled | Ad | LV | RV | Total |
|---|---|---|---|---|---|---|---|
| July 30 | Seine | 6577 | 6577 | 6 | 6 | 12 | 24 |
| Aug 8 | Seine | 11920 | 1980 | 5 | 7 | 3 | 15 |
| Aug 13 | Seine | 22737 | 285 | 0 | 0 | 3 | 3 |
| Aug 24 | Seine | 23155 | 2000 | 1 | 2 | 2 | 5 |
| Aug 3-22 | Hat. Trap | 16974 | 11034 | 5 | 19 | 37 | 61 |
| Sept 26 | I.R. carcasses | --- | 1584 | 0 | 3 | 2 | 5 |
| | TOTAL | | 23,460 | 17 | 37 | 59 | 113 |

Total Return

| | |
|---|---|
| Seine Catch within hatchery harvest area | 93,173 |
| Transported from hatchery to Indian River | 4,500 |
| Indian River non-transported | 5,500 |
| SJC Hatchery trap | 16,974 |
| TOTAL | 120,147 |

Percent return of marked fish

| | Ad | LV | RV | Total |
|---|---|---|---|---|
| Number Marked | 8500 | 8500 | 8500 | 25,500 |
| Number Recovered | 17 | 37 | 59 | 113 |
| Percent Recovered | 0.2 | 0.44 | 0.69 | 0.44 |

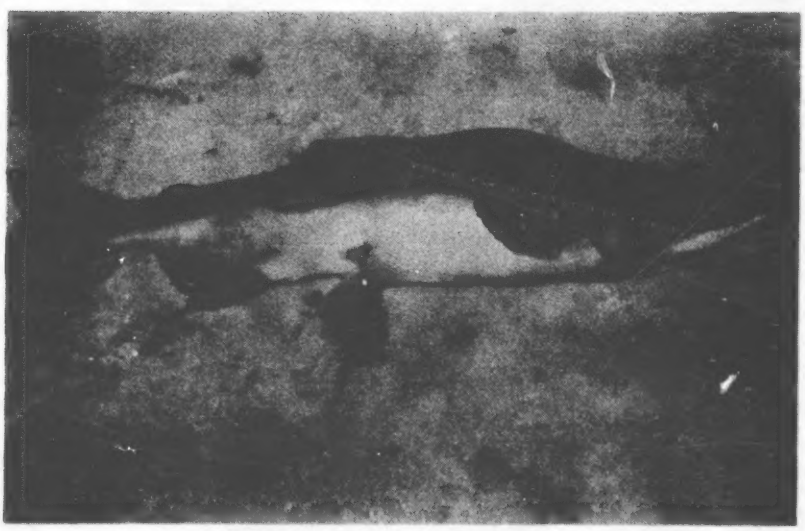
The percentage of marked fish among those sampled was 0.43 for seine caught fish, 0.55 for fish entering the hatchery trap and 0.32 for carcasses examined in lower Indian River. Pure homestream and homestream-donor stream cross marked fish were found about twice and three times (respectively) as commonly in the fish sampled than pure donor stock fish.

LV and RV marked fish made up 0.41% of the 23,460 fish sampled. If the fish sampled are representative of the total population returning to the SJ harvest area and Indian River, than the total number of LV and RV marked fish returning can be estimated by (0.0041)(120,147)= 483 marked fish. This is a percent return on the fry marked of 483 returning ÷ 17,000 marked = 2.89%.

Estimates in the literature of the relative survival of marked vs unmarked fish range from 1:1 to 1:2.7. Using this range and our data yields a total return from 1,783,666* fry released ranging from 50,656 to 136,771.

* includes an estimated 130,000 fry from 1000 adults allowed to spawn in the tailrace gravel.

PINK SALMON FRY BEING FIN MARKED IN 1976



FIN MARKED ADULT RETURNING IN 1977



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9. Conclusions - Uncertainty over the relative survival of marked fish versus unmarked as adults and the statistical validity of our sampling for marked fish make determination of the total percent return difficult or impossible. The lack of knowledge regarding the contribution of Indian River natural spawning and returning adults wandering in and out of the harvest area further complicate the task. It does seem possible, however, to conclude that in this case fish from a donor stream-home stream cross returned as well to the home stream as pure home stream fish. The timing difference between the release of the pure donor stock and the others brings into question any comparison between all three stocks. However, it appears the pure donor stock survived or home much more poorly than the other two groups.

V. Harvest Critique and Future Plans

Despite a return of 4-5 times the anticipated number of fish, their return almost 1 month earlier than expected , the difficulties in harvesting and selling the fish, and hatchery construction, the harvest and egg take going on simultaneously, everything turned out very well. Few fish were wasted, hatchery incubators were filled and Indian River escapements were achieved.

A. Harvest Regulations - The SJC staff are working with the Northern Southeast Regional Aquaculture Association staff in the formulation of regulations governing hatchery harvests which will be acceptable to the state, the common property fishermen and the private hatchery operators.

B. Selection of Fishermen - For 1978 and the future we will devise a more equitable way to select fishermen to catch the hatchery surplus. This may entail a bid system, a lottery or no selection at all. In the latter case, it may be possible to allow all fishermen to participate in the harvest within the SJC harvest area if all those fishing sold their fish to one tender located in the immediate area. Then the hatchery's portion of the value of the fish could be deducted from each vessels fish ticketed and paid directly to the hatchery by the processor.

As a general policy , as long as the hatchery is assured its operating expenses, it is more convenient economically, physically, and politically to allow the commericial fishermen to harvest all the fish. However, it is necessary for the hatchery to possess the technical and legal means to harvest using hatchery or contracted personnel in the event that fishermen are unwilling or unable to handle the hatchery fish. With this in mind we plan to improve our beach and hand purse seine capability for 1978.

C. Selection of Processor - The processor for 1978 will be selected, as last year, thru a bidding process. It appears that SE Alaska buyers will have increased processing and tender capacity for the 1978 run. Hopefully, less problem will exist in selling the hatchery fish. Additionally, with regulatory guidelines in place we can begin harvesting and

selling earlier in the run to obtain a better price for the fish.

D. Harvest Planning - The experience of 1977 has increased the hatchery staff's ability to estimate run size and timing. Also, it appears that during years of heavy returns (over 50,000 fish) it is very difficult for the fishermen to catch all the fish. Hatchery broodstock escapement may thus not be as difficult to protect as formerly thought. Our tenative plan will be to allow no harvest until at least 30,000 fish are estimated to be in the harvest area. From that point on, harvest periods and amounts will need to be regulated on a daily basis to obtain desired escapements from all portions of the run. In 1977, more eggs may have been taken from the early portion of the run than was desirable. Results of the 1976 and 1977 brood year tagging projects will yield data on the relative return rates of early and late run fish. This data may have an effect on harvest planning.

Barring unforeseen difficulties, one employee will work closely with the processor to insure more uniform handling of fish tickets and estimation of numbers harvested.

Once again, 1978 projected returns to the SJC hatchery are in the 16,000-32,000 range. This rate of return would justify little or no harvest or sale of fish except as carcasses. However, we will prepare as if 100,000 may return. As production from the hatchery peaks in 6-7 years, with the conversion of substantial amounts of the hatchery's effort to chum, coho, and king salmon production, a smaller proportion of the harvest in the hatchery harvest area will be needed for the hatchery. Our goal is that half or more of the hatchery production be for the common

property harvest. Our ability to reach this goal is dependent upon availability of chum, coho, and king salmon brood stock as well as the long-term average survivals of the fish.

## VI. Research Needs

Potentials for meaningful research are numerous, however several questions are of particular importance to the SJC program.

1. Determination of straying of hatchery fish to nearby streams, notably Salmon Creek, Camp Coogan, Starrigavan and Katlian.
2. Relative return rates of fry from early, middle and late run fish.
3. Success of 0+ coho smolts at SJC.
4. Influence of release method of fry on survival.
5. Sources and effects of predation on fry in the immediate hatchery area.
6. Development of three dimensional incubators suitable for water systems with high silt and/or biological fouling problems.
7. Identification and testing of new or more renumerative markets for hatchery-produced fish.

Another problem of major importance to Alaska hatchery development in general is:

8. Imprinting and return of pink and chum salmon to sites remote from the incubation facility.

We are currently taking data on a possible alternative for #6 and will evaluate the data in our next progress report. Returns of finmarked adults in 1978 and 1979 will provide considerable data on #2.

If time and money are available in the fall of 1978, we may attempt carcass checks and monitoring of seine-caught fish in the nearby fishing areas to gain some insight into #1. Possibly an estuarine marking effort on

early arriving adults and subsequent surveys of nearby streams might be appropriate in this area also.

At least 50% of 1978 brood year cohos and king salmon will be released as 0+ smolts with coded wire tags. Greater effort will be devoted in 1978 to obtain stomach content analysis on dolly varden and char and perhaps other fishes common in the immediate hatchery area. 1979 and 1980 marked fry releases may be designed to provide data on #4. Number 7 would entail a major research effort and additional funding. Development of the educational program and construction of the expanded hatchery facilities have precluded major research efforts. However, as those portions of the total program approach stability, more time will be devoted to research which may increase production or assist in hatchery management.

Table 1 Length-weight data on 1977 pink salmon from SJC hydro tailrace (Indian River water source) Sitka, Alaska. Measured from mid-eye to fork of tail.

| | | Length(cm) | Weight(kg) | Sample size |
|---|---|---|---|---|
| Females | Average | 53.34 | 2.2 | 657 |
| | Range | 42.5-59.8 | 1.4-3.05 | |
| Males | Average | 52.62 | 2.25 | 399 |
| | Range | 43.3-63.5 | 0.95-4.55 | |

Table 2 Indian River pink salmon fecundity and egg take, 1977.

| No. Females | Fecundity | No. Eggs | No. Males |
|---|---|---|---|
| 5333 | 1917 | 10,226,500 | 800 |

Table 3 Water temperatures of SJC hatchery August-December, 1977, recorded by Taylor 14 day Thermograph in degrees Celsius.

| | High | Low | Mean |
|---|---|---|---|
| August | 12.0 | 9.0 | 10.1 |
| September | 10.5 | 6.0 | 8.2 |
| October | 7.0 | 5.0 | 6.0 |
| November | 5.0 | 2.0 | 3.1 |
| December | 2.5 | 0.0 | 1.2 |

Appendix A

Financial Report July 1 to December 31, 1977

Northwest Area Foundation and SJC Matching Funds

| | Budget | Spent | Balance |
|---|---|---|---|
| I. Salaries | | | |
| Staff | 45,000 | 22,131.63 | 22,868.37 |
| Students | 5,600 | 3,789.65 | 1,810.35 |
| Benefits | 12,300 | 6,101.18 | 6,198.82 |
| II. Travel (Staff and High School Program) | 6,000 | 3,657.86 | 2,342.14 |
| III. Materials and Supplies Instruction & Hatchery | 8,855 | 1,310.12 | 7,544.88 |
| IV. Office Expenses Supplies, telephone, printing | 3,000 | 1,232.00 | 1,768.00 |
| V. Equipment Hatchery Construction | 36,000 | 26,908.89 | 9,091.11 |
| TOTALS | 116,755 | 65,131.33 | 51,623.67 |
| VI. Funding Sources | | | |
| NWA Grant | 106,755 | 62,074.17 | 44,680.83 |
| SJC Matching | 10,000 | 3,057.16 | 6,942.84 |

Appendix B

Financial Report November 1 to December 31, 1977

Sea Grant Funds

| | Budget | Spent | Balance |
|---|---|---|---|
| I. Salaries | | | |
| Staff | 37,500 | 4,828.36 | 32,671.64 |
| Students | 2,070 | 0 | 2,070.00 |
| Benefits | 5,625 | 949.25 | 4,675.75 |
| II. Travel | 2,000 | 332.32 | 1,667.68 |
| III. Office | 1,300 | 143.06 | 1,156.94 |
| IV. Equipment | 2,000 | 45.53 | 1,954.47 |
| V. Indirect Costs | 7,000 | 961.45 | 6,038.55 |
| TOTALS | 57,495 | 7,259.17 | 50,235.03 |

Appendix C

INCOME FROM 1977 SALMON HARVEST AND EGG INCUBATION

| | |
|---|---|
| Gross Income from Salmon Harvest | $ 116,466.00 |
| 465,863 lbs x 25¢/lb | |
| Paid to Fishermen for Harvesting | 23,293.00 |
| equals 20% commission | |
| Net Income from Salmon Harvest | 93,173.00 |
| | |
| Gross Income from Incubation of Oregon State eggs | 9,400.00 |
| Shipping Costs | 261.00 |
| Net Income from Incubation of eggs | 9,139.00 |
| 1¢ / viable egg shipped | |
| | |
| Total Net Income for 1977 | 102,312.00 |

Current Status of 1977 Income to be Used for Fiscal 1978 Hatchery Operations

| | |
|---|---|
| 180 Day Time Certificate of Deposit, NBA, Sitka | 100,000.00 |
| Interest of 6½ % at Maturity | 6,056.00 |
| Accounts Receivable from Sheldon Jackson College | 2,573.00 |
| Egg Shipping Costs + Remainder Over 100,000 | |
| Total Operating Assets for 1978 from 1977 Income | $108,629.00 |

Appendix D

TECHNICAL ADVISORY COMMITTEE

Chairman:

Chet Mattson
National Marine Fisheries Service
Auke Bay, Alaska

Dan Rosenberg
Metlakatla Island Res.

W.I.(Bob) Palmer
Alaska Fisheries Council

Donald Barrett
Career Education Coordinator
Tlingit and Haida Indians

Peter Azure, Director
Native Studies
Sheldon Jackson College

Richard Eliason
State Representative

Ross Soboleff
Tlingit and Haida Indians

Charles Osborne
U.S. Fish and Wildlife

Mark Jacobs
SEALASKA Corp.

Dr. Ken Leon
Alaska Dept. of
Fish and Game

Dr. Richard Neve
Coordinator of Shore
Programs
Univ. of Alaska

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